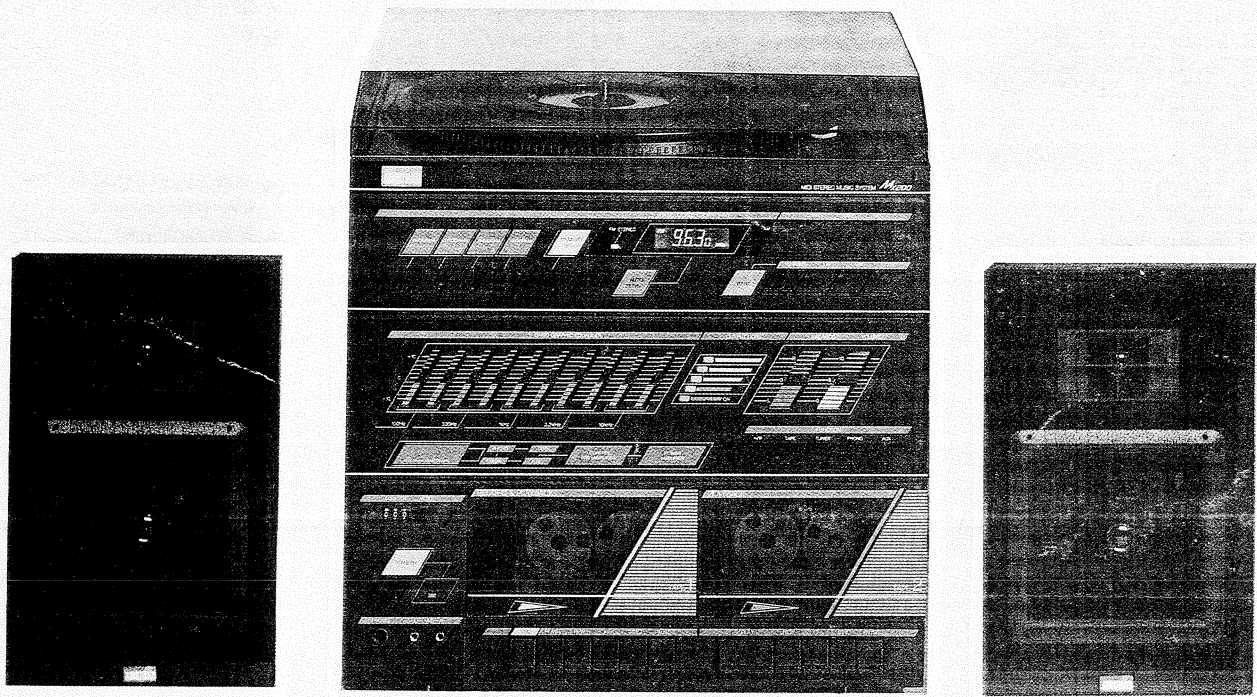
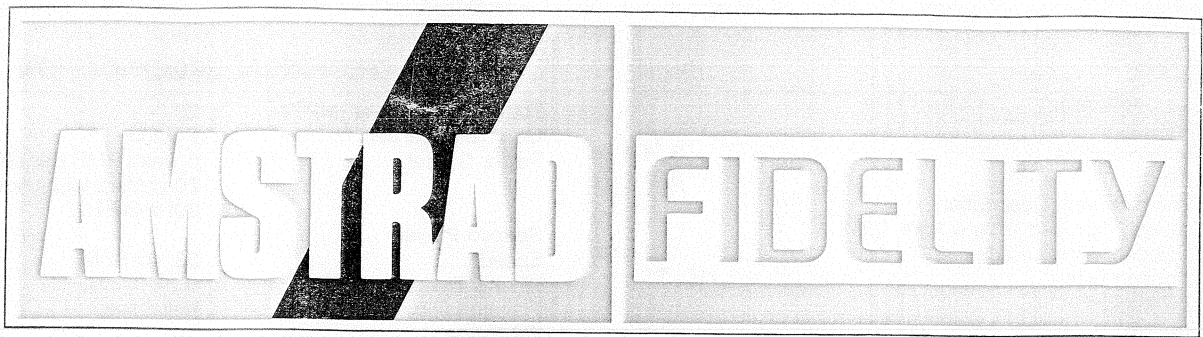




**MX200M  
MIDI SYSTEM  
MX200T  
TOWER SYSTEM  
SERVICE MANUAL**

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## TECHNICAL SPECIFICATION

|                                                |                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------|
| Total Output Power (MPO)                       | : 20                                                                               |
| Graphic Equaliser                              | : 5 Band                                                                           |
| Power Output                                   | : 5 watts RMS per channel into 4Ω<br>20 watts total peak music power<br>20Hz-20kHz |
| <b>Record Player</b>                           |                                                                                    |
| Speed                                          | : 33, 45 RPM                                                                       |
| Wow & Flutter                                  | : 0.1%                                                                             |
| Transmission                                   | : Belt Drive                                                                       |
| <b>FM Tuner</b>                                |                                                                                    |
| Manual up/down                                 |                                                                                    |
| Auto Seek Scanning                             |                                                                                    |
| Programmable 4-preset memory                   |                                                                                    |
| FM Frequency Range                             | : 87.5-108MHz                                                                      |
| FM Sensitivity                                 | : 5μV                                                                              |
| <b>AM Tuner</b>                                |                                                                                    |
| Manual up/down                                 |                                                                                    |
| Auto Seek Scanning                             |                                                                                    |
| Programmable 4-preset memory<br>(MW, LW)       |                                                                                    |
| AM Frequency Range                             | : MW 522-1611kHz<br>LW 153-281kHz                                                  |
| AM Sensitivity                                 | : MW 250μV/m<br>LW 500μV/m                                                         |
| <b>Tape Decks</b>                              |                                                                                    |
| Twin tape, continuous play<br>and tape counter |                                                                                    |
| Tape Speed                                     | : 4.75cm/sec                                                                       |
| Wow & Flutter                                  | : 0.2%                                                                             |
| Dimensions                                     | : 36W x 36D x 38H cm                                                               |
| Speakers                                       | : 21W x 17D x 33H cm                                                               |
| Weight                                         | : 7Kg                                                                              |
| Speakers                                       | : 2.5Kg each                                                                       |
| Mains                                          | : 240V AC 50Hz                                                                     |

### SAFETY

All units are tested to the following safety specification during manufacture:-

- Flash Test:** Tested at 2.2kV between live and neutral of the mains lead joined together and all accessible metal points on the exterior of the set.
- Insulation resistance test:** Tested between the live and neutral of the mains lead joined together and all accessible metal points on the exterior of the set to show a resistance of at least 4Mohms at 500V DC.
- Earth lead continuity test:** Tested for a continuity of less than 0.5ohms at 10 Amps between the earth of the mains lead and the record deck transit screw.

If there are any doubts about continued electrical safety after servicing, the above tests should be carried out.

In keeping with our policy of continually improving our service, and the technical quality of our products, we reserve the right to change components types, manufacturers, sources of supply or technical specification at any time.

AMSTRAD PLC  
BRENTWOOD HOUSE, 169 KINGS ROAD, BRENTWOOD, ESSEX CM14 4EF.  
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# ALIGNMENT INSTRUCTIONS

## AM Alignment

| Circuit Alignment | Equipment Connection                               | Step | Gen. Freq.         | Dial Setting | Adjustments                                      |
|-------------------|----------------------------------------------------|------|--------------------|--------------|--------------------------------------------------|
| IF                | AM signal generator with loop antenna (See Fig. 1) | 1    | 450kHz (1kHz Mod.) | 552kHz       | T4 (AM IFT)<br>Adjust for maximum output.        |
|                   |                                                    | 2    |                    |              | Repeat until no further improvement can be made. |

Measure output across 4Ω load.

## MW Alignment

| Circuit Alignment       | Equipment Connection                                                              | Step | Gen. Freq.          | Dial Setting    | Adjustments                                                |
|-------------------------|-----------------------------------------------------------------------------------|------|---------------------|-----------------|------------------------------------------------------------|
| LOCAL OSC (BAND)        | Connect DC Volt meter to TP3 and GND.                                             | 1    |                     | 522kHz          | L5 (AM OSC. Coil)<br>Adjust for 1.5V on the meter reading. |
| RF AMPLIFIER (TRACKING) | AM signal generator with loop antenna. SSVM across 4Ω load. 2ft from bar antenna. | 2    | 603kHz (1kHz Mod.)  | Tune to signal. | L3 (MW Ant. coil)<br>Adjust for maximum output.            |
|                         |                                                                                   | 3    | 1404kHz (1kHz Mod.) | Tune to signal. | TC2 (MW Ant. trimmer)<br>Adjust for maximum output.        |
|                         |                                                                                   | 4    |                     |                 | Repeat steps 2 and 3 several times.                        |

Measure output across 4Ω load.

## LW Alignment

| Circuit Alignment       | Equipment Connection                                                        | Step | Gen. Freq.         | Dial Setting    | Adjustments                                                          |
|-------------------------|-----------------------------------------------------------------------------|------|--------------------|-----------------|----------------------------------------------------------------------|
| LOCAL OSC (BAND)        | Connect DC Volt meter to TP3 and GND.                                       | 1    |                    | 153kHz          | TC4 (LW OSC. trimmer)<br>Adjust for 1.2V on the meter reading.       |
| RF AMPLIFIER (TRACKING) | AM signal generator with loop antenna. SSVM across 4 ohm load. (See Fig. 2) | 2    | 160kHz (1kHz Mod.) | Tune to signal. | L4 (LW Ant. coil)<br>Adjust coil on ferrite core for maximum output. |
|                         |                                                                             | 3    | 270kHz (1kHz Mod.) | Tune to signal. | TC3 (LW Ant. trimmer)<br>Adjust for maximum output.                  |
|                         |                                                                             | 4    |                    |                 | Repeat steps 2 and 3 several times.                                  |

Measure output across 4Ω load.

## FM Alignment

| Circuit Alignment       | Equipment Connection                                                                                      | Step | Gen. Freq.       | Dial Setting    | Adjustments                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------|------|------------------|-----------------|---------------------------------------------------------------------|
| LOCAL                   | Connect DC Volt meter to TP2 and GND.                                                                     | 1    |                  | 87.5MHz         | L2 (FM OSC)<br>Adjust for 2V on the meter reading.                  |
| RF AMPLIFIER (TRACKING) | FM Signal generator to antenna terminals through 75 ohm antenna matching network. SSVM across 4 ohm load. | 2    | 90.0MHz (Mod.)   | Tune to signal. | L1 (FM RF Coil)<br>Adjust for maximum output – stretch or squeeze.  |
|                         |                                                                                                           | 3    | 106.0 MHz (Mod.) | Tune to signal. | TC1 (FM RD Trimmer)<br>Adjust for maximum output.                   |
|                         |                                                                                                           | 4    |                  |                 | Repeat steps 2 and 3 to obtain sensitivity at 90.0MHz and 106.0MHz. |

| Circuit Alignment | Equipment Connection                 | Step | Gen. Freq.     | Dial Setting | Adjustments                                                           |
|-------------------|--------------------------------------|------|----------------|--------------|-----------------------------------------------------------------------|
| IF                | Sweep output — TP4.<br>output — TP1. | 1    | 1.7MHz         | 87.5MHz      | T1, T2 (FM IFT)<br>Adjust for maximum and must symmetrical "S" curve. |
|                   |                                      | 2    |                |              | Repeat step 1. (10.7MHz at the center point)                          |
|                   | FM SG across FM ant.                 | 3    | 87.5MHz (Mod.) | 87.5MHz      | T3 (FM IFT)<br>Adjust for minimum distortion.                         |

## FM MPX Alignment

| Circuit Alignment | Equipment Connection            | Step | Gen. Freq.     | Dial Setting | Adjustments                                                                                            |
|-------------------|---------------------------------|------|----------------|--------------|--------------------------------------------------------------------------------------------------------|
| 19kHz             | Freq. counter from TP5 and GND. |      | 98.0MHz (Mod.) | 98.0MHz      | First make sure FM section is properly aligned. Adjust SFR1 for frequency counter indication of 19kHz. |

## CASSETTE SECTION

| Description                                          | Equipment connection | Adjusting points          | Adjustments                                            |
|------------------------------------------------------|----------------------|---------------------------|--------------------------------------------------------|
| Measure output and frequency across 4 $\Omega$ load. | See Fig. 8           | Semi-fixed resistor VR601 | A counter indicates 3kHz. (Use 3kHz Test Tape MTT-111) |
| Measure output and frequency across 4 $\Omega$ load. | See Fig. 8           | Adjust Screw (See Fig. 9) | Adjust for maximum output. (L/R) (Use 8kHz Test Tape)  |

| Description              | Equipment connection | Adjusting points | Adjustments                                    |
|--------------------------|----------------------|------------------|------------------------------------------------|
| Recording Bias Frequency | See Fig. 10          | Rec. OSC coil T5 | Frequency Counter indicates 72kHz $\pm$ 0.2kHz |

## PHONO ALIGNMENT

| Description | Equipment connection | Adjusting points                  | Adjustments                                      |
|-------------|----------------------|-----------------------------------|--------------------------------------------------|
| Phono Speed | See Fig. 11          | Semi-fixed resistor (See Fig. 12) | A counter indicates 3kHz. (Use 3kHz Test Record) |

## SPECIFICATIONS

### AM PERFORMANCE

|     | Test Item                          | Measured at (kHz) | Unit | Nominal  | Limit    |
|-----|------------------------------------|-------------------|------|----------|----------|
| 1.  | Frequency coverage                 |                   | kHz  | 520—1610 | 520—1610 |
| 2.  | Intermediate frequency             |                   | kHz  | 450      | —        |
| 3.  | Sensitivity (S/N 20dB)             | 600               | μV/m | 500      | 1000     |
|     |                                    | 1000              | μV/m | 350      | 800      |
|     |                                    | 1400              | μV/m | 350      | 800      |
| 4.  | S/N ratio at 5mV/m input           | 1000              | dB   | 40       | 35       |
| 5.  | Selectivity (at quiet sens.)       | 1000              | dB   | ±25      | ±20      |
| 6.  | THD at 5mV/m, 30% mod.             | 1000              | %    | 2        | 4        |
| 7.  | THD at 100mV/m, 80% mod.           | 1000              | %    | 4        | 10       |
| 8.  | AGC figure of merit                | 1000              | dB   | 45       | 38       |
| 9.  | Image rejection ratio              | 1400              | dB   | 31       | 27       |
| 10. | IF rejection ratio                 | 600               | dB   | 31       | 27       |
| 11. | Whistle modulation (1mV/m input)   | 900 \$ 1350       | %    | 5        | 15       |
| 12. | Whistle modulation (5mV/m input)   | 900 \$ 1350       | %    | 5        | 10       |
| 13. | Whistle modulation (100mV/m input) | 900 \$ 1350       | %    | 5        | 15       |
| 14. | Auto stop sensitivity              | 1000              | μV/m | 500      | 2000     |
| 15. | Audio fidelity (−6dB, 1kHz 0dB)    | 1000              | Hz   | 50–2100  | 100–1800 |
| 16. | Bandwidth                          | 1000              | kHz  | 6        | 4–9      |

### FM PERFORMANCE

|     | Test Item                    | Measured at (MHz) | Unit | Nominal    | Limit      |
|-----|------------------------------|-------------------|------|------------|------------|
| 1.  | Frequency coverage           |                   | MHz  | 87.5–108.1 | 87.5–108.1 |
| 2.  | Intermediate frequency       |                   | MHz  | 10.7       | —          |
| 3.  | Sensitivity (S/N 30dB)       | 90.1              | μV   | 10         | 20         |
|     |                              | 98.1              | μV   | 10         | 20         |
|     |                              | 106.1             | μV   | 10         | 20         |
| 4.  | IHF Sensitivity              | 90.1              | μV   | 20         | 40         |
|     |                              | 98.1              | μV   | 20         | 40         |
|     |                              | 106.1             | μV   | 20         | 40         |
| 5.  | Indicator Sensitivity        | 98.1              | μV   | 15         | 30         |
| 6.  | Image rejection ratio        | 106.1             | dB   | 26         | 20         |
| 7.  | IF rejection ratio           | 90.1              | dB   | 65         | 50         |
| 8.  | Selectivity (400kHz/1mV)     | 98.1              | dB   | ±25        | ±15        |
| 9.  | 3dB limiting                 | 98.1              | μV   | 15         | 30         |
| 10. | AM suppression 1mV           | 98.1              | dB   | 40         | 30         |
| 11. | Auto stop sensitivity        | 98.1              | μV   | 15         | 30         |
| 12. | Harmonic distortion (1mV)    | 98.1              | %    | 1.0        | 3.0        |
| 13. | Over load distortion (100mV) | 98.1              | %    | 2.0        | 3.5        |

|     | Test Item                   |       | at (MHz) | Unit | Nominal | Limit |
|-----|-----------------------------|-------|----------|------|---------|-------|
| 14. | De-emphasis.<br>(400Hz=0dB) | 100Hz | 98       | dB   | 0       | 0±3   |
|     |                             | 10kHz | 98       | dB   | -13     | -13±3 |
| 15. | S/N ratio (1mV)             |       | 98       | dB   | 50      | 40    |
| 16. | Channel separation at       | 100Hz | 98       | dB   | 30      | 20    |
|     |                             | 1kHz  | 98       | dB   | 30      | 20    |
|     |                             | 10kHz | 98       | dB   | 20      | 15    |

## TAPE PERFORMANCE — Play Back

|    | Test Item                       | Unit   | Nominal | Limit    | Test Tape & Condition |
|----|---------------------------------|--------|---------|----------|-----------------------|
| 1. | Harmonic distortion %           | 1.0    | 2.0     | MTT-212E |                       |
| 2. | S/N ratio (un weighted)         | dB     | 50      | 45       | MTT-150               |
| 3. | Channel crosstalk w/1kHz B.P.F. | dB     | 40      | 30       | MTT-141               |
| 4. | Playback audio fidelity (±5dB)  | Hz     | -       | 60-10K   | MTT-256               |
| 5. | Tack crosstalk w/1kHz B.P.F.    | dB     | 55      | 50       | MTT-121               |
| 6. | Tape speed deviation            | %      | +0.5    | +3/-2    | MTT-111               |
| 7. | Wow & flutter WRMS/JIS          | %      | 0.15    | 0.35     | MTT-111               |
| 8. | Rew/FF time                     | sec    | 112     | 130      | C-60                  |
| 9. | Torque                          | Play   | g-cm    | -        | 35-70                 |
|    |                                 | Rew/FF | g-cm    | -        | 50-105                |

## TAPE PERFORMANCE — Over All

|    | Test Item                      | Input level | Unit | Nominal | Limit  |
|----|--------------------------------|-------------|------|---------|--------|
| 1. | Harmonic distortion            | Dolby Level | %    | 1.5     | 3.0    |
| 2. | S/N ratio Dolby                | Dolby Level | dB   | 48      | 44     |
| 3. | Channel crosstalk (w/1kHz BPF) | Dolby Level | dB   | 40      | 30     |
| 4. | Fidelity (±5dB)                | Dolby Level | Hz   | -       | 60-10K |
| 5. | Mic. sens (Dolby Level)        | -           | dB   | -65     | ±3     |
| 6. | Erase ratio (w/1kHz BPF)       | Dolby Level | dB   | 60      | 50     |

Condition: AC-223 test tape; 500mW/8 ohm output.

## AUDIO PERFORMANCE — AMP SECTION

|    | Test Item                                      | Unit | Nominal | Limit   |
|----|------------------------------------------------|------|---------|---------|
| 1. | Frequency response at 30W output with THD 0.9% | Hz   |         | 20-20K  |
| 2. | Sensitivity at 30W 1kHz (Aux input)            | mV   | 150     | ±3dB    |
| 3. | Harmonic distortion (1kHz)                     | %    | 1.5     | 4       |
| 4. | Minimum Hum (RMS)                              | mV   | 1.0     | 5.0     |
| 5. | Overload capacity (clip point)                 | mV   | 2500    |         |
| 6. | Equalizer control range                        | dB   | ±10     | ±7 - 13 |
| 7. | Crosstalk 1kHz (w/BPF) input shorted           | dB   | 42      | 35      |
| 8. | S/N ratio (input shorted)                      | dB   | 50      | 40      |

Condition: 1kHz test frequency; 500mW/8 ohm output; AUX input.

**NOTE:** Nominal specs represent the design specs; all units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit specs present the absolute worst condition that still might be considered acceptable; in no case should a unit perform to less than within any limit spec.

# DIGITAL TUNING SYSTEM DESCRIPTION

The MX200's Digital Tuning System provides full electronic control of a vari-cap tuned FM/MW/LW receiver. The block diagram of the system is shown in Fig-1. This is a phase locked loop Digital Tuning System. 4 bit CMOS 1 chip micro computer which consists of LCD driver, 150MHz pre-scaler, IF counter, PLL frequency synthesizer and controller, installed.

It accepts directly an AM local oscillator signal and a FM local oscillator signal, and outputs control signals for closed loop operation of these oscillators. The outputs drive filters for supplying analog voltages to the vari-cap tuners. The frequency of the tuned station is displayed on 5 digit multiplexed display. 4 favorite stations on each (FM x 4, MW/LW x 4) band can be stored as well as "last stations tuned" information.

## Example of FM Operation

When receiving 98.0MHz, the VCO generates 108.7MHz ( $98.0 + 10.7$  (IF) MHz). The signal passes through Buffer Amp (Q1) (Q2), and then is applied to Pin 8 of PLL IC, IC 4.

This frequency is divided by Programmable Divider of PLL IC (IC 4); the resulting output will be 25kHz.

The Reference Oscillator 4.5MHz is divided by Reference Divider of PLL IC (IC 4); the resulting in another 25kHz frequency.

These two 25kHz signals are fed to the Phase Detector. An error voltage is generated by the Phase Detector, which is proportional to the phase difference between these two 25kHz signals. This error voltage appears at Pin 12 of IC 4 and passes through the LPF where the error voltage is integrated, and harmonics and noise are filtered out. The resulting DC voltage is applied to the varicap Diodes D26 (part of VCO) whose capacity varies with applied DC voltage. Thus the output frequency of VCO is corrected. With proper circuit design and precise adjustments, the VCO frequency is accurate and precise when the system is "locked", meaning the Phase Detector sensed no phase differences between the two 25kHz signals and the VCO generates a frequency which is as accurate and stable as the reference crystal oscillator.

## Example of AM Operation (The basic PLL circuitry system is same as in FM mode.)

When receiving 999kHz, VCO generates a 1449kHz signal ( $999 + 450$  (IF) kHz). The AM VCO output signal, 1449kHz, which passes through Buffer Amp IC2 is applied to Pin 9 of PLL IC 4. This frequency is divided by N (=161). The resulting output will be 9kHz.

The Reference Oscillator 4.5MHz, is divided by 500 resulting in another 9kHz frequency.

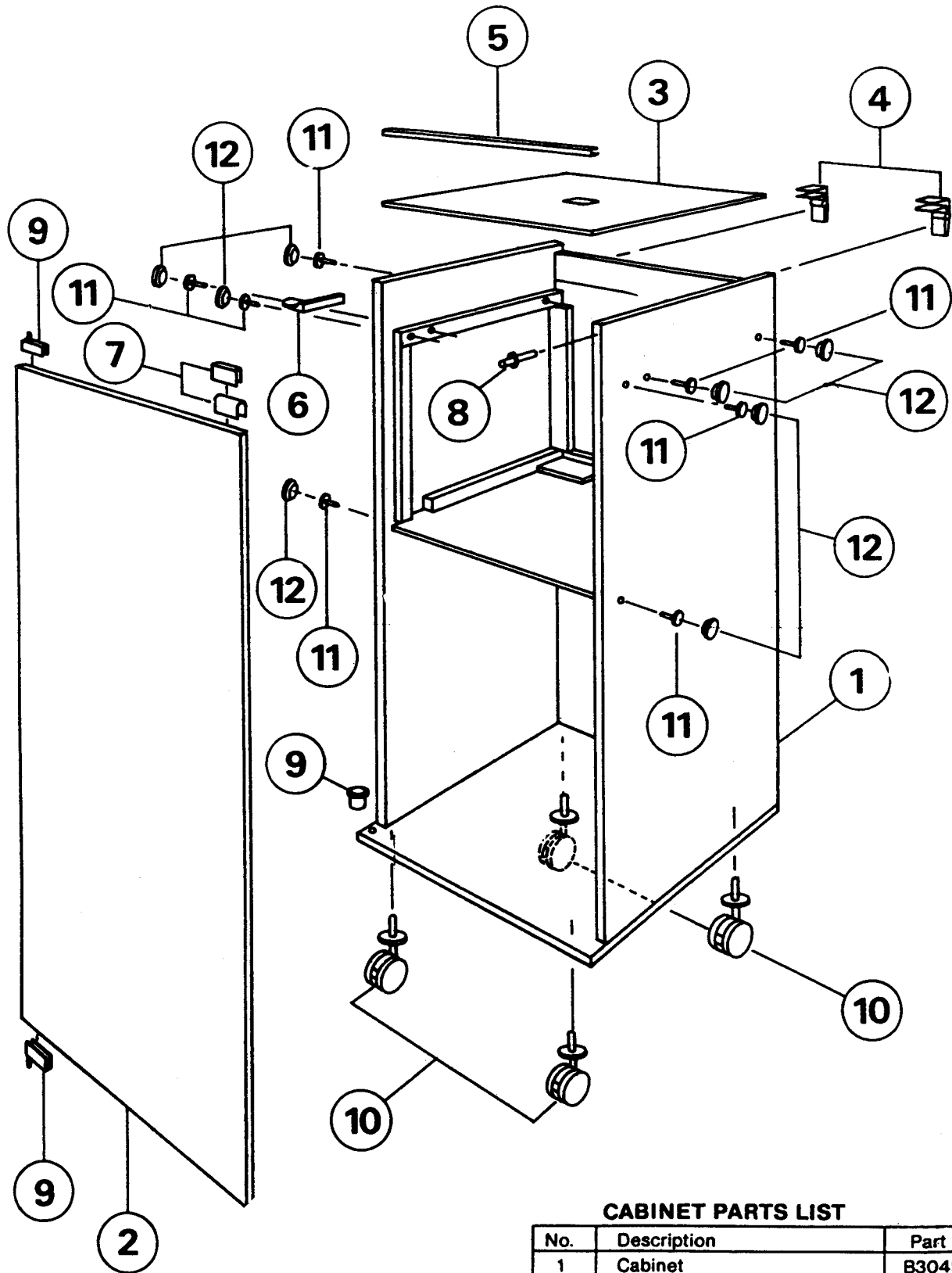
These two 9kHz signals are fed to the Phase Detector. An error voltage is generated by the Phase Detector, which is in proportion to the phase difference between these two 9kHz signals. This error voltage appears at Pin 11 of IC 4 and passes through the LPF where the error voltage is integrated, and harmonics and noise are filtered out. The resulting DC voltage is applied to the Varicap Diode D8 (part of VCO) whose capacity varies with applied DC voltage. Thus the output frequency of VCO is corrected. With proper circuit design and precise adjustments, the VCO frequency is accurate and precise.

When the system is "locked", the phase detector senses no phase differences and generates a frequency which is as accurate and stable as the reference crystal oscillator.

## Note:

1. PLL Frequency synthesizer provides direct programmable divider so the system does not need pre-scaler circuit.
2. Receiving Frequency FM Band 87.5MHz ~ 108.0MHz (50kHz Step)  
MW Band 520kHz ~ 1611kHz (9kHz Step)  
LW Band 153kHz ~ 281kHz (1kHz Step)

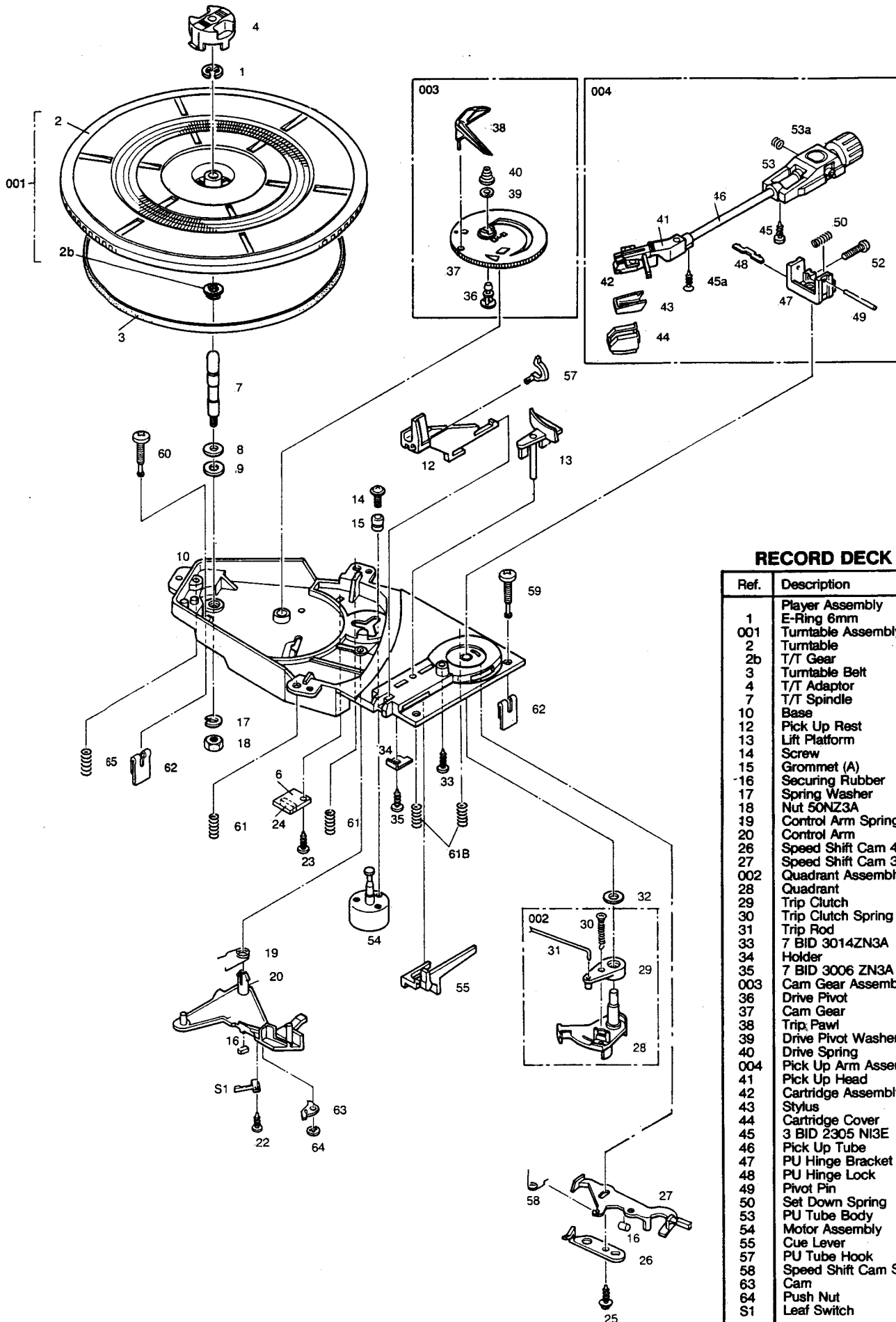
# TOWER CABINET EXPLODED VIEW & PARTS LIST



## CABINET PARTS LIST

| No. | Description          | Part No. |
|-----|----------------------|----------|
| 1   | Cabinet              | B3049/6  |
| 2   | Glass Door           | 70004    |
| 3   | Lid Record Deck      | 70003    |
| 4   | Hinge Lid            | 90008    |
| 5   | Trim Lid             | 90030    |
| 6   | Rest Lid             |          |
| 7   | Handle Assy.         | 93003    |
| 8   | Magnetic Lock        | 90016    |
| 9   | Hinge Glass Door Kit | 90011    |
| 10  | Castors              | 90100    |
| 11  | Screws               |          |
| 12  | Screw Caps           | B1044    |

# EXPLODED VIEW (PLAYER)



## RECORD DECK PARTS LIST

| Ref. | Description            | Part No. |
|------|------------------------|----------|
| 1    | Player Assembly        | 202480   |
| 001  | E-Ring 6mm             | 202487   |
| 2    | Turntable Assembly     | 202488   |
| 2b   | Turntable              | 202489   |
| 3    | T/T Gear               | 202490   |
| 4    | Turntable Belt         | 202491   |
| 7    | T/T Adaptor            | 202492   |
| 10   | T/T Spindle            | 202493   |
| 12   | Base                   | 202496   |
| 13   | Pick Up Rest           | 202497   |
| 14   | Lift Platform          | 202498   |
| 15   | Screw                  | 202499   |
| 16   | Grommet (A)            | 202500   |
| 17   | Securing Rubber        | 202501   |
| 18   | Spring Washer          | 202502   |
| 19   | Nut 50NZ3A             | 202506   |
| 20   | Control Arm Spring     | 202504   |
| 26   | Control Arm            | 202505   |
| 27   | Speed Shift Cam 45     | 202510   |
| 002  | Speed Shift Cam 33     | 202511   |
| 28   | Quadrant Assembly      | 202512   |
| 29   | Quadrant               | 202513   |
| 30   | Trip Clutch            | 202514   |
| 31   | Trip Clutch Spring     | 202515   |
| 32   | Trip Rod               | 202516   |
| 33   | 7 BID 3014ZN3A         | 202517   |
| 34   | Holder                 | 202518   |
| 35   | 7 BID 3006 ZN3A        | 202519   |
| 003  | Cam Gear Assembly      | 202520   |
| 36   | Drive Pivot            | 202521   |
| 37   | Cam Gear               | 202522   |
| 38   | Trip Pawl              | 202523   |
| 39   | Drive Pivot Washer     | 202524   |
| 40   | Drive Spring           | 202525   |
| 004  | Pick Up Arm Assembly   | 202526   |
| 41   | Pick Up Head           | 202527   |
| 42   | Cartridge Assembly     | 202528   |
| 43   | Stylus                 | 202529   |
| 44   | Cartridge Cover        | 202530   |
| 45   | 3 BID 2305 NI3E        | 202532   |
| 46   | Pick Up Tube           | 202533   |
| 47   | PU Hinge Bracket       | 202534   |
| 48   | PU Hinge Lock          | 202535   |
| 49   | Pivot Pin              | 202536   |
| 50   | Set Down Spring        | 202538   |
| 53   | PU Tube Body           | 202540   |
| 54   | Motor Assembly         | 202541   |
| 55   | Cue Lever              | 202542   |
| 57   | PU Tube Hook           | 202543   |
| 58   | Speed Shift Cam Spring | 202544   |
| 63   | Cam                    | 202550   |
| 64   | Push Nut               | 202551   |
| S1   | Leaf Switch            | 202553   |

# TROUBLESHOOTING GUIDE

## RECEIVER SECTION

| CIRCUIT | SYMPTOM                         | CAUSE                                                                    | REMEDY                                                                                               |
|---------|---------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| GENERAL | Inoperative                     | Defective power switch (S19)                                             | Replace as necessary.                                                                                |
|         |                                 | Open circuit in transformer (T8)                                         | Check current and voltages.<br>Replace as necessary.                                                 |
|         | No sound                        | Defective volume control                                                 | Check volume control resistance for continuous operation.<br>Replace as necessary.                   |
|         |                                 | Defective function switch (S13-17)<br>Defective SPEAKER FUSE (F401, 402) | Repair or replace switch.<br>Replace as necessary.                                                   |
| AM      | No sound                        | Defective detector                                                       | Check voltages in this circuit.<br>Repair/replace as necessary.                                      |
|         |                                 | Open circuit in AM IFT, ANF<br>RF coil or Osc. coil (T4, L3, 4, 5)       | Check voltages and resistance.<br>Replace as necessary.                                              |
|         | Weak sound<br>(low sensitivity) | IF misaligned                                                            | Re-adjust<br>(See Alignment Instructions).                                                           |
|         |                                 | RF misaligned                                                            | Re-adjust<br>(See Alignment Instructions).                                                           |
|         |                                 | Defective IC2                                                            | Check voltages.<br>Replace as necessary.                                                             |
|         |                                 | Poor contact in Antenna circuit                                          | Resolder and/or repair.<br>Replace as necessary.                                                     |
|         |                                 | Defective function switch (S15, 3, 4)                                    | Repair replace switch.                                                                               |
|         |                                 | Defective in Detector                                                    | Check voltages.                                                                                      |
| FM      | No sound                        | Open circuit in FM IFT (T1, 2, 3)<br>Antenna coil or Osc. coil (L1, L2)  | Check voltages and resistances.<br>Replace as necessary.                                             |
|         | Weak sound<br>(low sensitivity) | Defective FM tuner                                                       | Check RF, IF and Detector circuits.<br>Check voltages of IC1 and IC2.<br>Replace parts as necessary. |
|         |                                 | RF misaligned                                                            | Re-adjust (See Alignment Instructions).                                                              |
|         |                                 | Defective IC1, IC2                                                       | Check voltages and replace as necessary.                                                             |
|         |                                 | Poor contact in FM Ant.                                                  | Resolder or replace as necessary.                                                                    |
| MPX     | Poor separation                 | Improper adjustment of VCO                                               | Re-adjust SFR1.<br>(See Alignment Instructions).                                                     |
|         | No stereo Indicator             | Faulty D25                                                               | Check indicator D25 and circuit.<br>Replace as necessary.                                            |

|          |                                          |                                                            |                               |
|----------|------------------------------------------|------------------------------------------------------------|-------------------------------|
| AM or FM | No tuning<br>(no Up/Down)<br>(no Search) | Defective UP (DOWN) switch                                 | Replace as necessary.         |
|          |                                          | Defect in PLL circuit                                      | Check voltages of IC705, IC4. |
|          | No preset                                | Defective memory switch (SW8) or preset<br>switch (SW9-12) | Replace as necessary.         |
|          |                                          | Defect in PLL circuit                                      | Check voltages of IC4.        |

## CASSETTE SECTION

| SYMPTOM                                                                            |                   | CIRCUIT             | REMEDY                                                                                                                              |
|------------------------------------------------------------------------------------|-------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| No sound                                                                           | on both channels  | Power supply        | Check voltage of transformer of T6.<br>Replace as necessary.<br>Check voltage at emitter of Q305.<br>Replace as necessary.          |
|                                                                                    | on Rch (Lch)      | Motor               | Check voltage at motor (9V)<br>If not proper voltage, change motor.                                                                 |
|                                                                                    |                   | Pre-amplifier       | Check voltage of IC301.<br>Replace as necessary.                                                                                    |
| Distortion                                                                         | on Rch (Lch)      | Pre-amplifier       | Check voltage of IC301.<br>Replace as necessary.                                                                                    |
| Poor high frequency                                                                | on Rch (Lch)      | Tape head           | Check head azimuth.<br>Re-align as in the alignment instructions.<br>Replace if head scratched.                                     |
|                                                                                    |                   | Equalizer amplifier | Check voltage of IC301.<br>Replace as necessary.                                                                                    |
| No erasing or no recording                                                         | on both Lch & Rch | Bias oscillator     | Check erase head.<br>Check Bias current.<br>Replace Osc. coil T5 as necessary.                                                      |
| Defect in recording<br>(no recording, weak recording or excessive recording level) | on Rch (Lch)      | Record amplifier    | Check that rec-signal is supplied to R/P head.<br>If no rec-signal is supplied, check mic jack, R/P slide switch and IC302 voltage. |
|                                                                                    |                   | Bias                | Check bias current.<br>Replace Osc. coil T5 as necessary.                                                                           |

## PHONO SECTION

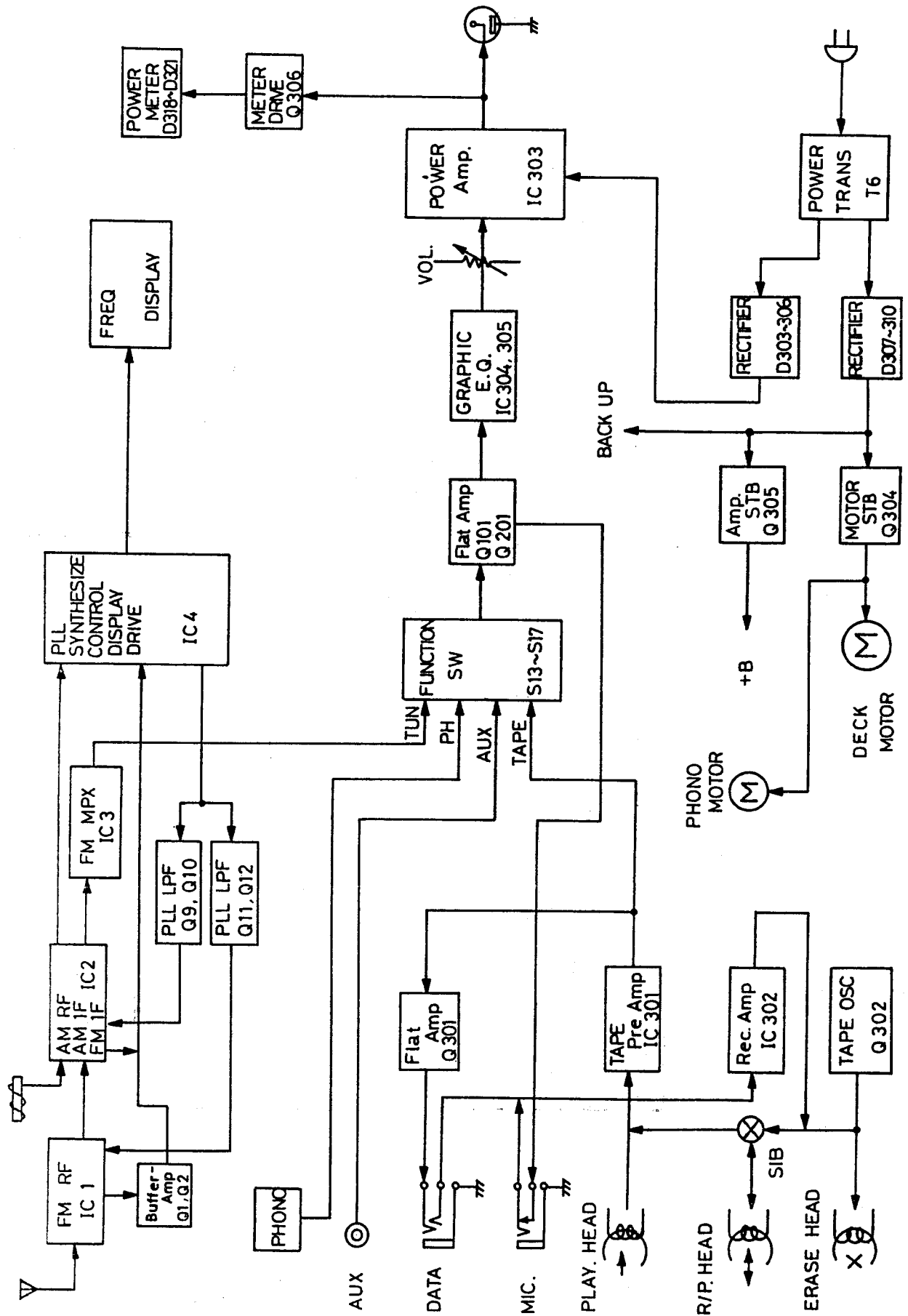
| SYMPTOM  |                  | CIRCUIT      | REMEDY                                                                                                                      |
|----------|------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------|
| No sound | on both channels | Power supply | Check voltage of transformer of T6.<br>Replace as necessary.<br>Check voltages at emitter of Q305.<br>Replace as necessary. |
|          | on Rch (Lch)     | Motor        | Check voltage of Q304.<br>If not proper voltage, change motor.                                                              |

# ELECTRICAL PARTS LIST

| Circ. Ref.                                                               | Description                                      | Part No. |
|--------------------------------------------------------------------------|--------------------------------------------------|----------|
| <b>I.C.s</b>                                                             |                                                  |          |
| IC1                                                                      | IC LA1185, Front End                             | 202157   |
| IC2                                                                      | IC LA1266, AM/FM IF                              | 202158   |
| IC3                                                                      | IC LA3361, MPX                                   | 200402   |
| IC4                                                                      | IC UPD1713AG-015, PLL/Counter                    | 202159   |
| IC301                                                                    | IC BA3402, Play Amp                              | 200902   |
| IC302                                                                    | IC BA3312N, Record Amp                           | 202161   |
| IC303                                                                    | IC UPD1335V, Power Amp                           | 202450   |
| IC304                                                                    | IC BA3812L, Graphic Eq.                          | 200407   |
| IC305                                                                    | IC BA3812L, Graphic Eq.                          | 200407   |
| <b>Transistors</b>                                                       |                                                  |          |
| Q1, 2                                                                    | Tr 2SC1923                                       | 202201   |
| Q3, 6, 14, 15                                                            | Tr 2SA1015                                       | 170453   |
| Q4, 5, 7-13, 101, 201, 301-303, 306                                      | Tr 2SC1815                                       | 170447   |
| Q304                                                                     | Tr 2SC1383                                       | 202451   |
| Q305                                                                     | Tr 2SC1846                                       | 201073   |
| <b>Diodes</b>                                                            |                                                  |          |
| D1, 2, 4, 5, 9-21, 29-37, 301                                            | Diode 1SS176                                     | 201077   |
| D303-306                                                                 | Diode RL202F                                     | 202196   |
| D307-310                                                                 | Diode 1N4002F                                    | 202197   |
| D316                                                                     | Diode 1K261                                      | 202193   |
| D3, 6                                                                    | Varicap Diode                                    | 202188   |
| D7, 8                                                                    | Varicap Diode                                    | 202189   |
| D26                                                                      | Zener MTZ5.6                                     | 202190   |
| D302                                                                     | Zener MTZ12-                                     | 202198   |
| D317-321                                                                 | LED 365                                          | 202194   |
| D311                                                                     | LED 292                                          | 202195   |
| D25                                                                      | LED 205                                          | 201097   |
| <b>Coils &amp; Transformers</b>                                          |                                                  |          |
| L3, 4                                                                    | B791. Bar Antenna                                | 202176   |
| L2                                                                       | M076. FM Osc Coil                                | 202442   |
| L1                                                                       | M127. FM RF Coil                                 | 201082   |
| L5                                                                       | M635. AM Osc Coil                                | 202443   |
| T4                                                                       | M300. AM IF Coil                                 | 202444   |
| T1                                                                       | M237. FM IF Coil                                 | 202445   |
| T2                                                                       | M637. FM IF Coil                                 | 202182   |
| T3                                                                       | M658. FM IF Coil                                 | 202183   |
| T5                                                                       | M351. Record Bias Coil                           | 202446   |
| <b>Filters &amp; Crystals</b>                                            |                                                  |          |
| F1                                                                       | 87.5-108MHz Band Pass Filter                     | 202447   |
| CF1                                                                      | 10.7MHz Ceramic Filter                           | 202448   |
| CF2                                                                      | 465kHz Ceramic Filter                            | 202449   |
| Description                                                              | Ref. No.                                         | Part No. |
| <b>Resistors</b><br>(All resistors are 1/5 watt unless otherwise stated) |                                                  |          |
| 1.5Ω/¼W                                                                  | R601                                             | 152140   |
| 1.5Ω/1W                                                                  | R317                                             | 151607   |
| 2.2Ω                                                                     | R129, 229                                        | 152142   |
| 4.7Ω                                                                     | R309                                             | 152146   |
| 8.2Ω/¼W                                                                  | R315                                             | 152150   |
| 22Ω                                                                      | R1                                               | 152156   |
| 47Ω                                                                      | R4, 113, 213                                     | 152160   |
| 56Ω                                                                      | R38, 126, 226                                    | 152161   |
| 82Ω                                                                      | R335                                             | 152164   |
| 100Ω                                                                     | R72                                              | 152166   |
| 100Ω/¼W                                                                  | R336                                             | 10032    |
| 150Ω                                                                     | R334                                             | 152168   |
| 180Ω                                                                     | R20, 62                                          | 152169   |
| 180Ω/¼W                                                                  | R332                                             | 10038    |
| 220Ω                                                                     | R8, 10, 316, 319                                 | 152170   |
| 270Ω                                                                     | R70, 305, 311                                    | 152171   |
| 390Ω                                                                     | R117, 217, 314                                   | 152173   |
| 470Ω                                                                     | R130, 230, 301                                   | 152174   |
| 470Ω/¼W                                                                  | R333                                             | 10048    |
| 560Ω                                                                     | R58, 312                                         | 152175   |
| 680Ω                                                                     | R9, 66, 310                                      | 152176   |
| 820Ω                                                                     | R22-24, 120, 220, 313                            | 152178   |
| 1kΩ                                                                      | R6, 7, 11, 13, 36, 45, 59, 67, 307               | 152179   |
| 1.2kΩ                                                                    | R321                                             | 152180   |
| 1.2kΩ/¼W                                                                 | R331                                             | 10063    |
| 2.2kΩ                                                                    | R25, 30, 63-65                                   | 152183   |
| 3.3kΩ                                                                    | R37, 52, 53, 61, 71, 119, 219                    | 152185   |
| 3.9kΩ                                                                    | R68, 69, 136, 138, 212, 236, 238                 | 152187   |
| 4.7kΩ                                                                    | R112, 137, 237, 303                              | 152188   |
| 5.6kΩ                                                                    | R28, 109, 209                                    | 152189   |
| 6.8kΩ                                                                    | R108, 208                                        | 152190   |
| 8.2kΩ                                                                    | R40, 51, 56, 57, 102, 202, 306                   | 152192   |
| 9.1kΩ                                                                    | R44                                              | 152193   |
| 10kΩ                                                                     | R3, 19, 26, 34, 35, 47, 104, 204                 | 152194   |
| 10kΩ/¼W                                                                  | R602                                             | 10085    |
| 12kΩ                                                                     | R14-16, 31, 50, 82, 121, 127, 128, 221, 227, 228 | 152195   |
| 15kΩ                                                                     | R41, 106, 206                                    | 152196   |
| 18kΩ                                                                     | R110, 210                                        | 152197   |
| 22kΩ                                                                     | R29, 116, 216                                    | 152198   |
| 27kΩ                                                                     | R54, 55                                          | 152199   |
| 39kΩ                                                                     | R81, 115, 215, 302                               | 152201   |
| 47kΩ                                                                     | R2, 32, 43, 46, 48, 73-80, 114, 214, 308         | 152203   |
| 56kΩ                                                                     | R12, 17                                          | 152204   |
| 82kΩ                                                                     | R18, 33, 42                                      | 152207   |
| 100kΩ                                                                    | R49, 83-85                                       | 152209   |
| 120kΩ                                                                    | R101, 201                                        | 152210   |
| 180kΩ                                                                    | R27, 103, 203                                    | 152212   |

| Description                       | Ref. No.                                                                             | Part No. |
|-----------------------------------|--------------------------------------------------------------------------------------|----------|
| 220kΩ                             | R21, 111, 211                                                                        | 152213   |
| 270kΩ                             | R320                                                                                 | 152214   |
| 330kΩ                             | R5                                                                                   | 152215   |
| 390kΩ                             | R107, 207                                                                            | 152216   |
| 680kΩ                             | R118, 218, 304                                                                       | 152219   |
| <b>Variable Resistors</b>         |                                                                                      |          |
| Slide Pot.                        | 5 off for graphic eq.                                                                | 202452   |
| Slide Pot.                        | 1 off for main volume                                                                | 202453   |
| Slide Pot.                        | 1 off for balance                                                                    | 202454   |
| 6.8kΩ                             | Potentiometer                                                                        | 202455   |
| 1kΩ                               | Potentiometer                                                                        | 202456   |
| 2kΩ                               | Potentiometer                                                                        | 202211   |
| <b>Ceramic Capacitors</b>         |                                                                                      |          |
| 4pF                               | C3                                                                                   | S/150487 |
| 5pF                               | C8                                                                                   | 200507   |
| 10pF                              | C9                                                                                   | 809250   |
| 13pF                              | C5                                                                                   | 800363   |
| 15pF                              | C67                                                                                  | 400106   |
| 56pF                              | C23                                                                                  | 810311   |
| 68pF                              | C16                                                                                  | 150516   |
| 100pF                             | C46, 114, 214                                                                        | 24016    |
| 270pF                             | C132, 232                                                                            | 150501   |
| 330pF                             | C30, 64                                                                              | 150518   |
| 470pF                             | C116, 216, 305                                                                       | 24004    |
| 680pF                             | C55                                                                                  | 200522   |
| 820pF                             | C134, 234                                                                            | 800209   |
| 0.001μF                           | C2, 4, 11, 29, 66, 101, 107, 118, 142, 201, 207, 218, 242                            | 24027    |
| 0.0012μF                          | C102, 202                                                                            | 153321   |
| 0.022μF                           | C1, 6, 10, 13, 25, 27, 28, 39, 40, 71, 320-327, 329                                  | 21027    |
| 0.047μF                           | C14, 17, 19-21, 31, 33, 54, 72, 330-333                                              | 21008    |
| <b>Semi-Conductive Capacitors</b> |                                                                                      |          |
| 0.001μF                           | C44                                                                                  | 151579   |
| 0.0015μF                          | C109, 209                                                                            | 152582   |
| 0.0022μF                          | C312                                                                                 | 151580   |
| 0.0027μF                          | C136, 236                                                                            | 200534   |
| 0.0082μF                          | C108, 138, 208, 238                                                                  | 200971   |
| 0.015μF                           | C37, 58, 59, 106, 206                                                                | 152389   |
| 0.01μF                            | C18, 63, 65, 69, 70, 104, 110, 131, 204, 210, 231                                    | 151583   |
| 0.022μF                           | C311                                                                                 | 151585   |
| 0.027μF                           | C140, 240                                                                            | 151941   |
| 0.033μF                           | C74, 233                                                                             | 151586   |
| 0.1μF                             | C222                                                                                 | 150887   |
| <b>Styrol Capacitors</b>          |                                                                                      |          |
| 300pF                             | C26                                                                                  | 202559   |
| 370pF                             | C22                                                                                  | 800236   |
| 1000pF                            | C47                                                                                  | 130132   |
| <b>Polypropylene Capacitors</b>   |                                                                                      |          |
| 470pF/100V                        | C314                                                                                 | 202558   |
| 0.0039μF/100V                     | C313                                                                                 | 202536   |
| <b>Electrolytic Capacitors</b>    |                                                                                      |          |
| 0.1μF/10V                         | C115                                                                                 | 202557   |
| 3.3μF/50V                         | C35, 43                                                                              | 1400343  |
| 4.7μF/50V                         | C12, 34, 38, 45, 51-53, 56, 57, 73, 112, 113, 117, 212, 213, 217, 304, 309, 319, 344 | 150520   |
| 10μF/16V                          | C32, 75, 144, 244, 307                                                               | 20024    |
| 10μF/25V                          | C301                                                                                 | 200528   |
| 22μF/10V                          | C36                                                                                  | 20025    |
| 47μF/16V                          | C103, 119, 203, 219, 310                                                             | 20027    |
| 100μF/10V                         | C41, 61, 111, 211, 303, 315                                                          | 20028    |
| 100μF/16V                         | C76, 120, 220, 341                                                                   | 20028    |
| 220μF/16V                         | C62, 302, 318                                                                        | 20029    |
| 330μF/25V                         | C318                                                                                 | 120102   |
| 1000μF/25V                        | C123, 223                                                                            | 152567   |
| 1000μF/16V                        | C223                                                                                 | 1400345  |
| 2200μF/35V                        | C317                                                                                 | 20120    |
| <b>Switches</b>                   |                                                                                      |          |
| Push Switch Function              |                                                                                      | 202457   |
| Push Switch Power                 |                                                                                      | 202217   |
| Push Switch MS, BC                |                                                                                      | 202213   |
| Slide Switch R/Pb.                |                                                                                      | 202458   |
| <b>Miscellaneous</b>              |                                                                                      |          |
| Antenna Jack                      |                                                                                      | 202221   |
| Record Lever                      |                                                                                      | 202427   |
| Pin Jack AUX.                     |                                                                                      | 202222   |
| Mic. Jack                         |                                                                                      | 202459   |
| Speaker Jack                      |                                                                                      | 202226   |
| Headphone Jack                    |                                                                                      | 202461   |
| Power Transformer                 |                                                                                      | 202463   |
| Display                           |                                                                                      | 202232   |
| Lamp                              |                                                                                      | 202239   |
| Crystal                           |                                                                                      | 202241   |
| Trimmer FM/LW                     |                                                                                      | 202245   |
| Trimmer L/W                       |                                                                                      | 202246   |
| Head R/P                          |                                                                                      | 202464   |
| Head Play                         |                                                                                      | 202465   |
| Head Erase                        |                                                                                      | 202466   |
| Motor                             |                                                                                      | 202235   |
| Tape Counter                      |                                                                                      | 202248   |
| Fuse 1.6A                         |                                                                                      | 202252   |
| Fuse 800mA                        |                                                                                      | 202468   |

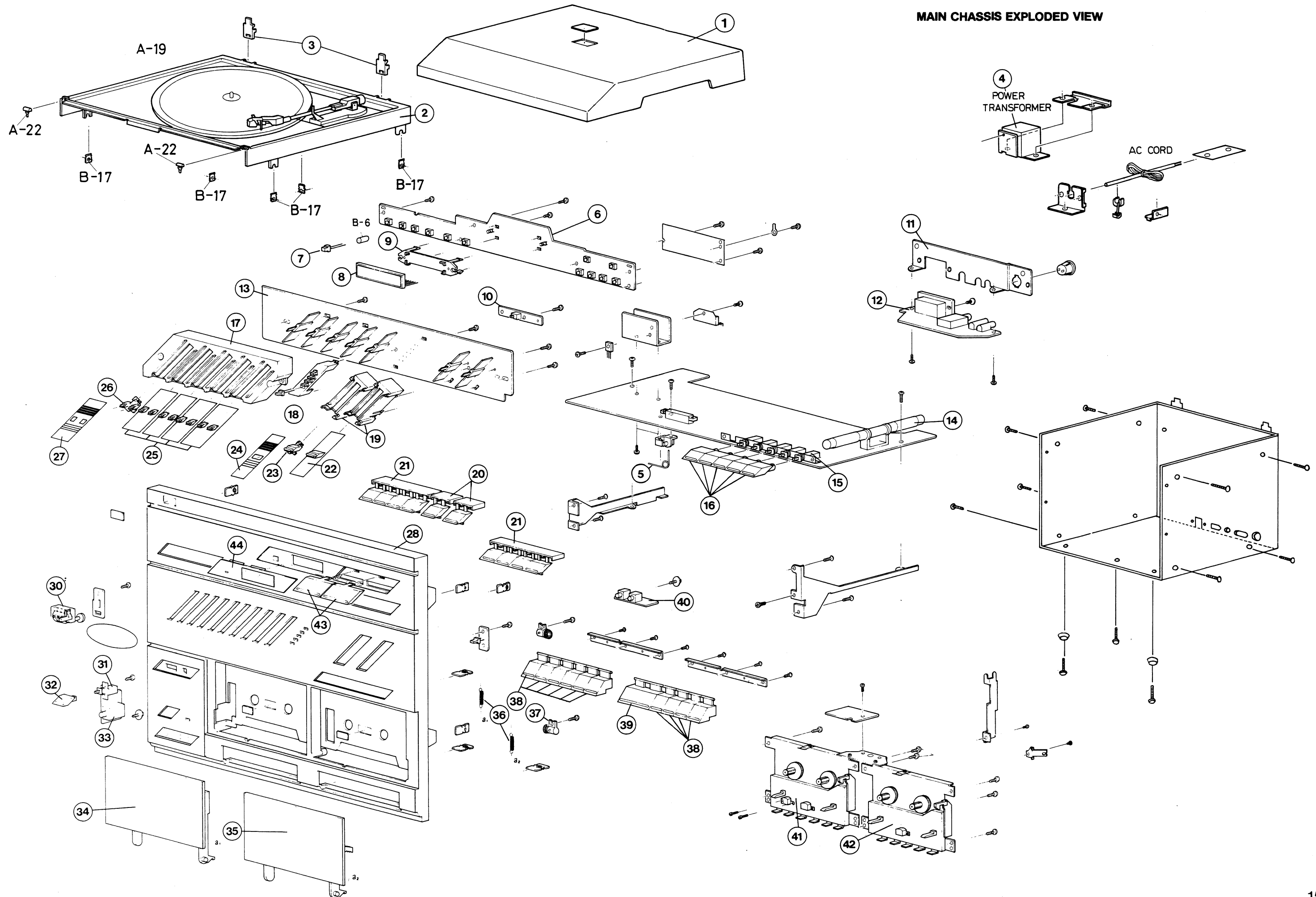
# BLOCK DIAGRAM



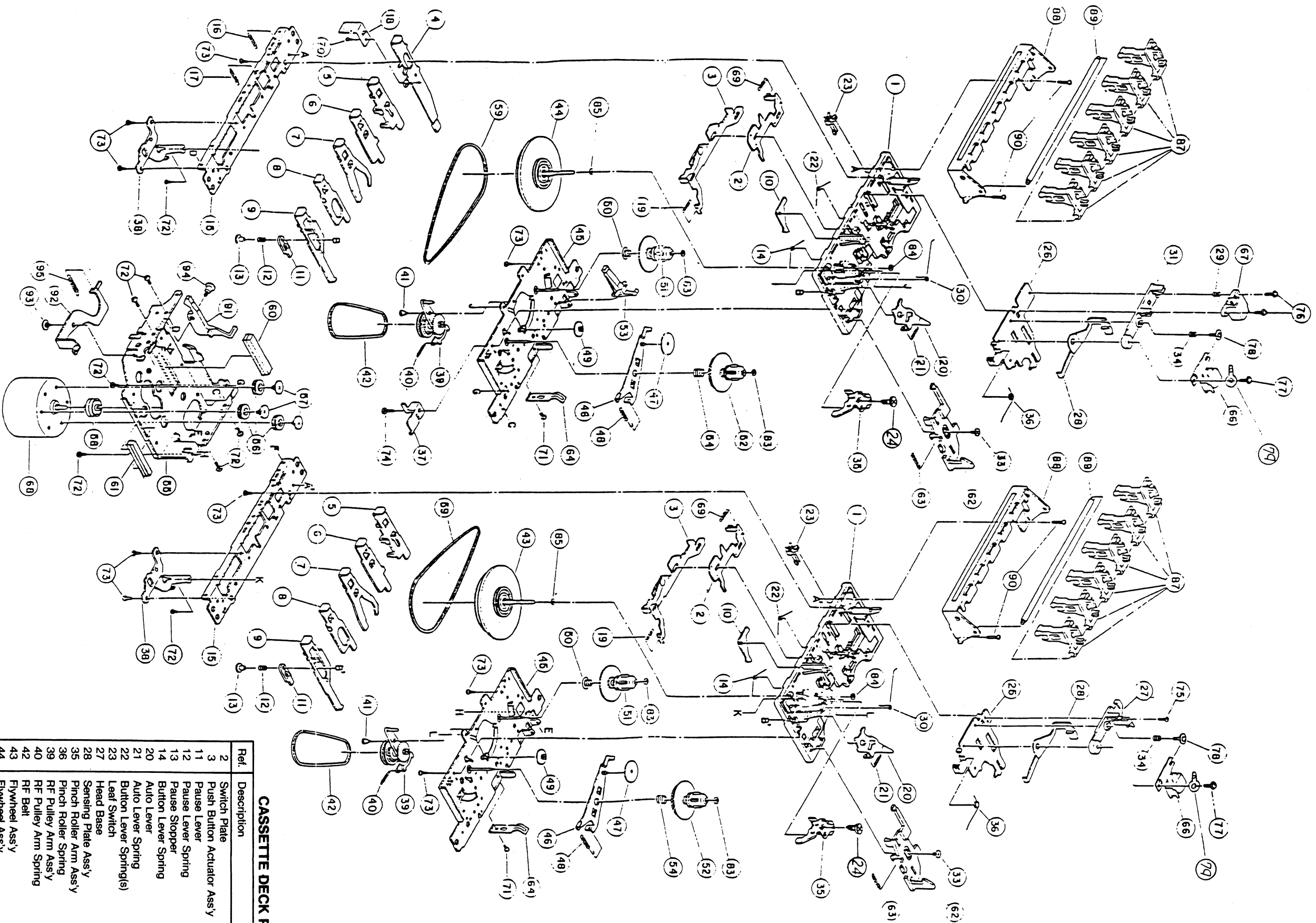
### MAIN CHASSIS PARTS LIST

| Ref. No. | Description                       | Part No. |
|----------|-----------------------------------|----------|
| 1        | Dust Cover                        | 202031   |
| 2        | Record Deck                       | 202029   |
| 3        | Hinge                             | 202033   |
| 4        | Power Transformer                 | 202463   |
| 5        | Record Spring                     | 202056   |
| 6        | Main PCB                          | 202485   |
| 7        | LED                               | 201097   |
| 8        | Display                           | 202232   |
| 9        | Display Back Plate                | 202040   |
| 10       | LED Power O/P                     | 202194   |
| 11       | Terminal Chassis                  | 202422   |
| 12       | Terminal Plate                    | 202501   |
| 13       | Graphic Equaliser PCB             | 202484   |
| 14       | Ferrite Rod                       | 202176   |
| 15       | Waveband Selector                 | 202457   |
| 16       | Push Button                       | 202011   |
| 17       | Slide Knob Base                   | 202417   |
| 18       | LED Holder                        | 202419   |
| 19       | Balance Knob Base                 | 202418   |
| 20       | Memory Button                     | 202010   |
| 21       | Selector Button                   | 202009   |
| 22       | Volume Graduation                 | 202409   |
| 23       | Balance Knob                      | 202019   |
| 24       | Balance Graduation                | 202408   |
| 25       | Graphic Equaliser Graduation Rear | 202502   |
| 26       | Equaliser Knob                    | 202406   |
| 27       | Equaliser Graduation              | 202407   |
| 28       | Front Assembly                    | 202401   |
| 29       | Tuning Knob                       | 202008   |
| 30       | Tape Counter                      | 202248   |
| 31       | Standby Switch                    | 202217   |
| 32       | Power Button                      | 202012   |
| 33       | Headphone Jack                    | 202461   |
| 34       | Cassette Door L                   | 202404   |
| 35       | Cassette Door R                   | 202405   |
| 36       | Door Spring                       | 202057   |
| 37       | Damper Assembly B                 | 202046   |
| 38       | Cassette Keys                     | 202013   |
| 39       | Play Key                          | 202014   |
| 40       | Mic. Jack                         | 202459   |
| 41       | Cassette Assembly A               | 202555   |
| 42       | Cassette Assembly B               | 202556   |

# MAIN CHASSIS EXPLODED VIEW



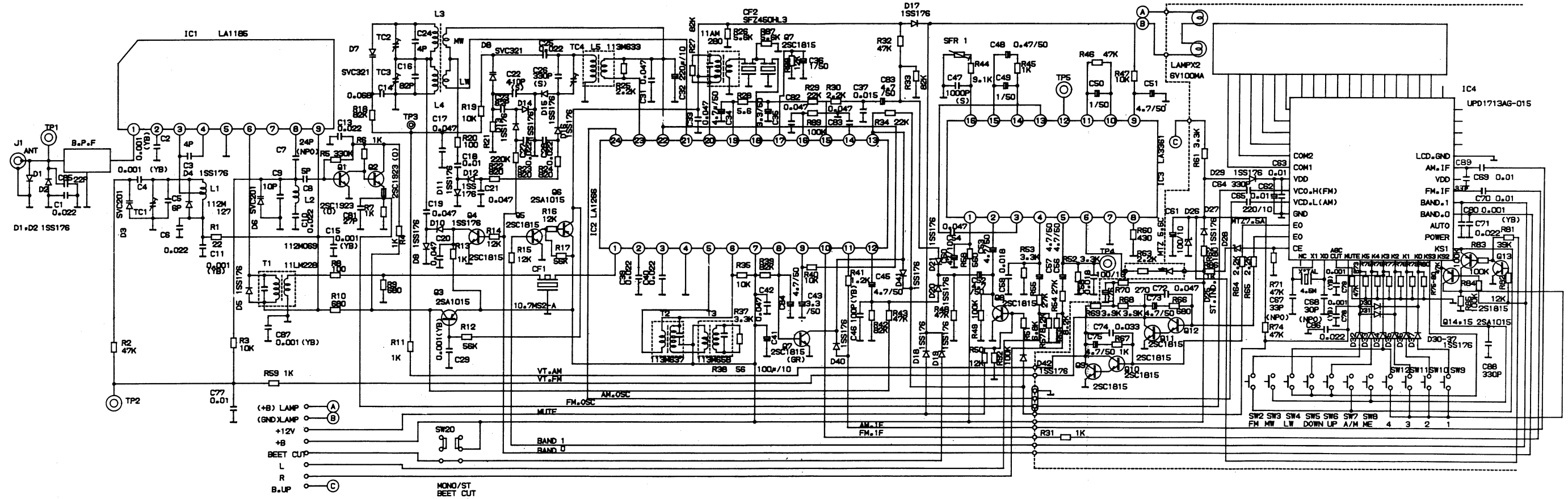
CASSETTE MECHANISM & PARTS LIST



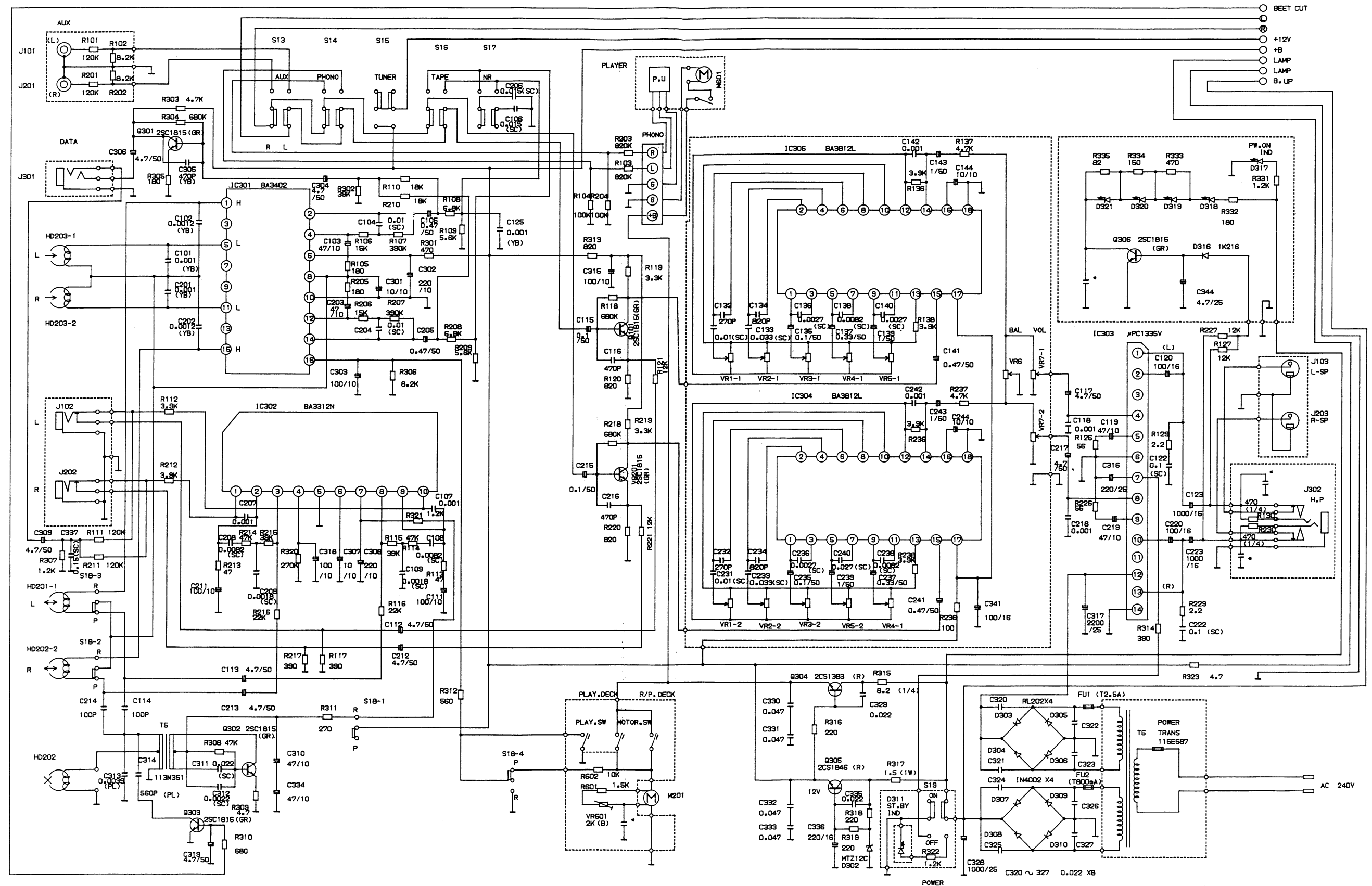
CASSETTE DECK PARTS LIST

| Ref. | Description               | Part No. |
|------|---------------------------|----------|
| 2    | Switch Plate              | 201732   |
| 3    | Push Button Actuator Assy | 201733   |
| 11   | Pause Lever               | 201734   |
| 12   | Pause Lever Spring        | 201735   |
| 13   | Pause Stopper             | 201736   |
| 14   | Button Lever Spring       | 201737   |
| 20   | Auto Lever                | 201738   |
| 21   | Auto Lever Spring         | 201739   |
| 22   | Button Lever Spring(s)    | 201740   |
| 23   | Leaf Switch               | 201741   |
| 27   | Head Base                 | 201742   |
| 28   | Sensing Plate Assy        | 201743   |
| 35   | Pinch Roller Arm Assy     | 201744   |
| 36   | Pinch Roller Spring       | 201745   |
| 39   | RF Pulley Arm Assy        | 201746   |
| 40   | RF Pulley Arm Spring      | 201747   |
| 42   | RF Belt                   | 201748   |
| 43   | Flywheel Assy             | 201749   |
| 44   | Flywheel Assy             | 201750   |
| 46   | Take Up Gear Plate Assy   | 201751   |
| 47   | Take Up Roller Gear       | 201752   |
| 49   | FF Gear                   | 201753   |
| 51   | Supply Reel Assy          | 201754   |
| 52   | Take Up Reel Assy         | 201755   |
| 53   | Record Safety Lever       | 201756   |
| 58   | Motor Pulley              | 201757   |
| 59   | Main Belt                 | 201758   |
| 62   | Eject Slide Lever         | 201759   |
| 63   | Eject Slide Lever Spring  | 201760   |
| 65   | Play Head                 | 201761   |
| 66   | Record Play Head          | 201762   |
| 67   | Erase Head                | 201763   |
| 68   | Motor                     | 201764   |
| 87   | Operation Lever           | 201765   |
| 89   | Button Lever Shaft        | 201766   |

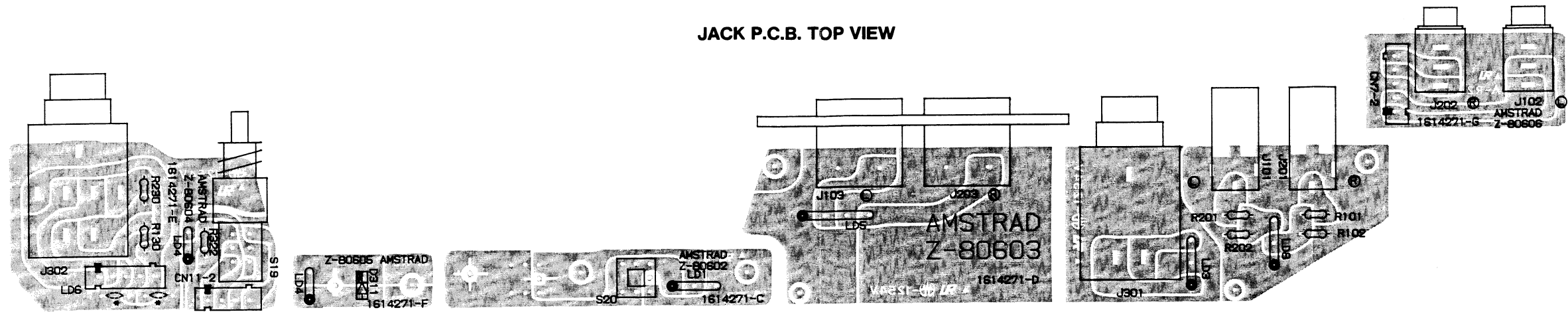
# TUNER SCHEMATIC DIAGRAM



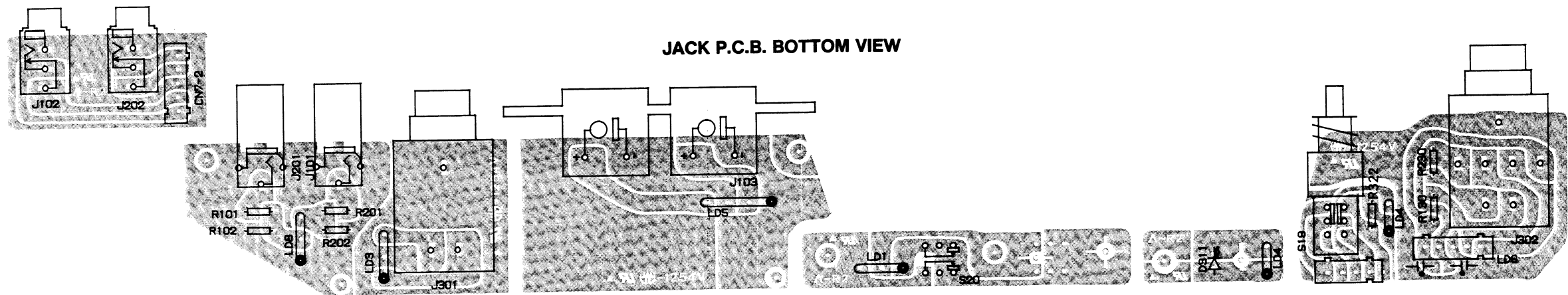
# MAIN P.C.B SCHEMATIC DIAGRAM



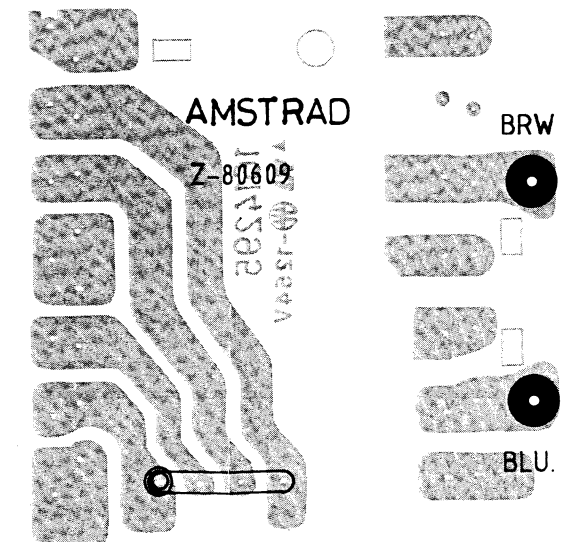
JACK P.C.B. TOP VIEW



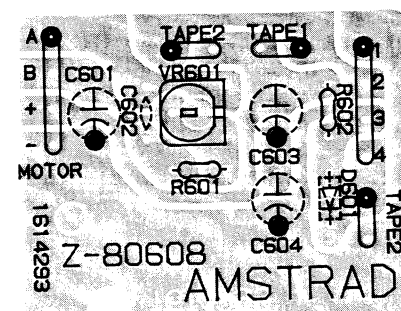
JACK P.C.B. BOTTOM VIEW



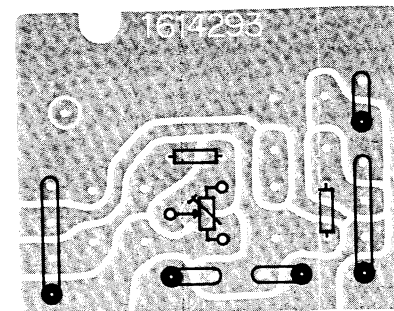
TRANSFORMER P.C.B.



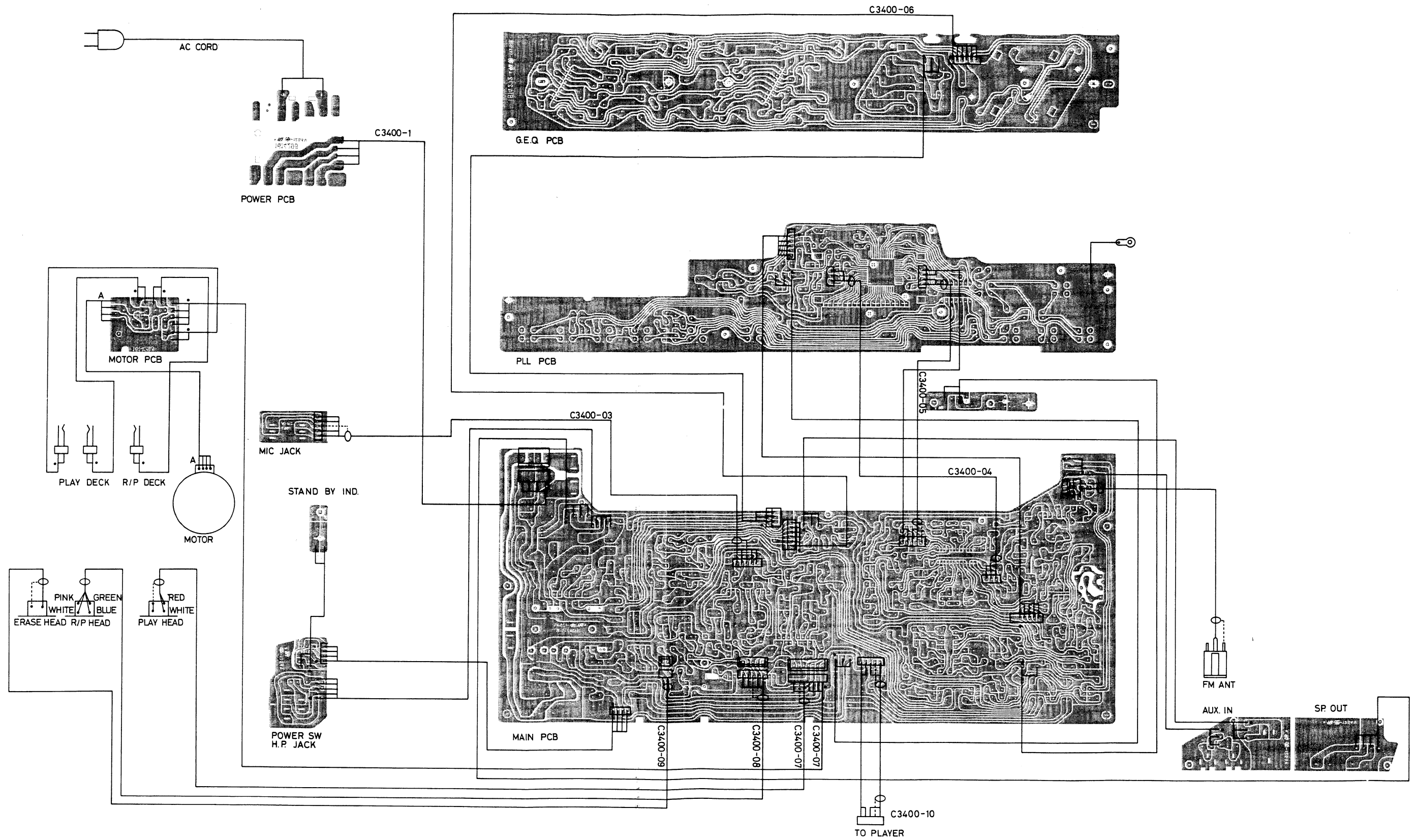
CASSETTE P.C.B. TOP VIEW



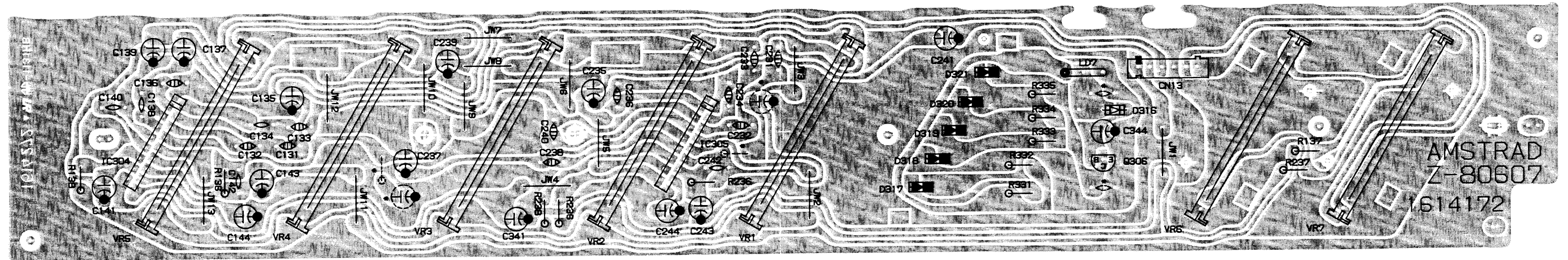
CASSETTE P.C.B. BOTTOM VIEW



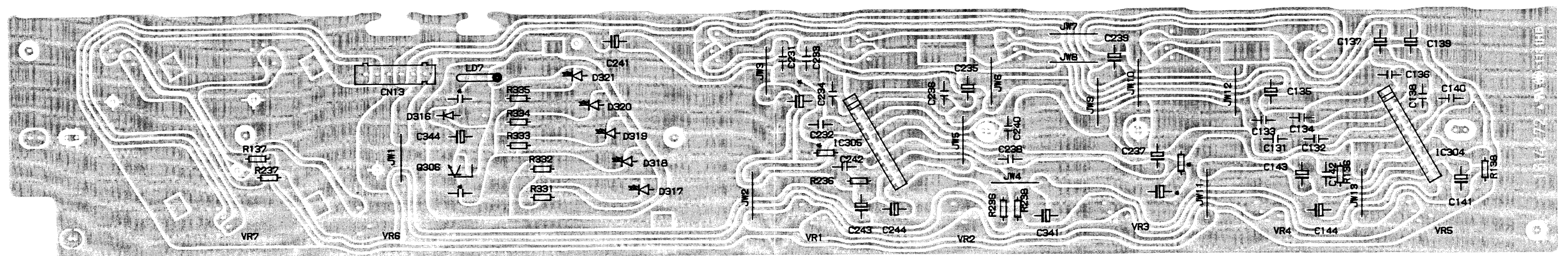
# WIRING DIAGRAM



### EQUALISER P.C.B. FRONT VIEW



### EQUALISER P.C.B. BACK VIEW







I.C. & TRANSISTOR VOLTAGES

| Pin No. | IC1    | IC2    |        | IC3    |        | IC301    | IC302        | IC303 | IC304,305 |
|---------|--------|--------|--------|--------|--------|----------|--------------|-------|-----------|
|         | FM (V) | FM (V) | AM (V) | FM (V) | AM (V) | TAPE (V) | TAPE.REC (V) | (V)   | (V)       |
| 1       | 1.0    | 2.47   | —      | 7.20   | 7.03   | 3.12     | —            | 9.63  | 5.02      |
| 2       | 1.69   | 2.47   | 1.07   | 2.33   | 2.33   | 3.19     | 0.57         | 18.70 | 6.16      |
| 3       | 4.98   | 2.47   | 1.07   | 1.67   | 1.67   | 3.12     | 3.31         | 0.73  | 6.16      |
| 4       | 1.67   | —      | —      | 1.70   | 1.70   | 3.12     | 0-0.7        | —     | 5.02      |
| 5       | —      | 9.08   | 9.76   | 1.70   | 1.70   | 3.12     | —            | 1.18  | 5.02      |
| 6       | 5.03   | 9.08   | 9.76   | 10.17  | 10.22  | 10.18    | 7.27         | —     | 6.16      |
| 7       | 4.28   | 9.08   | 9.76   | —      | —      | 3.12     | 7.30         | 18.30 | 6.16      |
| 8       | 4.99   | 0.64   | 0.64   | 0.43   | 0.43   | 3.12     | 3.26         | —     | 5.02      |
| 9       | 5.4    | 3.78   | —      | 0.47   | 2.86   | 3.12     | 0.56         | 1.18  | 5.02      |
| 10      | —      | 2.42   | 2.42   | 1.33   | 1.33   | —        | —            | 18.70 | 5.42      |
| 11      | —      | 2.27   | 1.96   | 1.33   | 1.33   | 3.12     | —            | 0.73  | 6.16      |
| 12      | —      | 3.32   | 3.09   | 0.99   | 0.05   | 3.12     | —            | 19.15 | 5.42      |
| 13      | —      | 0.03   | 0.02   | 1.33   | 1.33   | 3.12     | —            | 9.69  | 5.42      |
| 14      | —      | 1.28   | 1.32   | 1.33   | 1.33   | 3.07     | —            | —     | 5.42      |
| 15      | —      | 1.54   | 1.49   | 1.33   | 1.33   | 3.12     | —            | —     | 6.06      |
| 16      | —      | —      | —      | 0.80   | 0.09   | 1.11     | —            | —     | 6.21      |
| 17      | —      | —      | —      | —      | —      | —        | —            | —     | 10.42     |
| 18      | —      | 2.47   | 1.07   | —      | —      | —        | —            | —     | —         |
| 19      | —      | 1.54   | 1.44   | —      | —      | —        | —            | —     | —         |
| 20      | —      | 0.70   | 9.75   | —      | —      | —        | —            | —     | —         |
| 21      | —      | 4.0    | 3.64   | —      | —      | —        | —            | —     | —         |
| 22      | —      | 4.0    | 3.64   | —      | —      | —        | —            | —     | —         |
| 23      | —      | 4.0    | 3.64   | —      | —      | —        | —            | —     | —         |
| 24      | —      | 3.67   | 2.22   | —      | —      | —        | —            | —     | —         |

| Pin No. | FM 108.00 | MW 1611 | LW 270 | Pin No. | FM 108.00 | MW 1611 | LW 270 | Pin No. | FM 108.00 | MW 1611 | LW 270 | Pin No. | FM 108.00 | MW 1611 | LW 270 |
|---------|-----------|---------|--------|---------|-----------|---------|--------|---------|-----------|---------|--------|---------|-----------|---------|--------|
| 1       | 2.50V     | 2.6V    | 2.54V  | 14      | —         | —       | —      | 27      | 0.25V     | 0.31V   | 0.30V  | 40      | 2.50      | 2.60    | 2.53   |
| 2       | 2.50      | 2.6     | 2.55   | 15      | 2.13      | 2.21    | 2.16   | 28      | 4.99      | 5.24    | 5.07   | 41      | 2.50      | 2.60    | 2.53   |
| 3       | 2.50      | 2.6     | 2.55   | 16      | 2.17      | 2.26    | 2.21   | 29      | —         | —       | —      | 42      | 2.50      | 2.60    | 2.53   |
| 4       | 2.50      | 2.6     | 2.55   | 17      | —         | —       | —      | 30      | 3.24      | —       | 3.29   | 43      | 2.50      | 2.60    | 2.53   |
| 5       | 2.56      | 2.66    | 2.60   | 18      | 0.02      | 0.01    | 0.01   | 31      | —         | 5.13    | 4.0    | 44      | 2.50      | 2.60    | 2.53   |
| 6       | 2.56      | 2.66    | 2.60   | 19      | —         | —       | —      | 32      | —         | —       | 4.90   | 45      | 2.50      | 2.60    | 2.53   |
| 7       | 5.06      | 5.25    | 5.13   | 20      | 0.37      | 0.23    | 0.22   | 33      | 5.06      | 5.25    | 5.13   | 46      | 2.50      | 2.60    | 2.53   |
| 8       | 2.30      | —       | —      | 21      | —         | —       | —      | 34      | —         | —       | —      | 47      | 2.50      | 2.60    | 2.53   |
| 9       | —         | 2.26    | 2.21   | 22      | —         | —       | —      | 35      | —         | —       | —      | 48      | 2.50      | 2.60    | 2.53   |
| 10      | —         | —       | —      | 23      | —         | —       | —      | 36      | 2.50      | —       | 2.53   | 49      | 2.50      | 2.60    | 2.53   |
| 11      | 1.08      | 1.04    | —      | 24      | —         | —       | —      | 37      | 2.50      | 2.60    | 2.53   | 50      | 2.50      | 2.60    | 2.53   |
| 12      | 1.06      | 0.98    | —      | 25      | —         | 0.31    | 0.30   | 38      | 2.50      | 2.60    | 2.53   | 51      | 2.50      | 2.60    | 2.53   |
| 13      | 4.68      | 4.70    | 4.72   | 26      | 0.25      | 0.32    | 0.31   | 39      | 2.50      | 2.60    | 2.53   | 52      | 2.50      | 2.60    | 2.53   |

|   | Q1    | Q2    | Q3    |       |       | Q4    |       |       | Q5    |       | Q6    |       |       |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|   | FM    | FM    | FM    | MW    | LW    | FM    | MW    | LW    | FM    | MW/LW | FM    | MW    | LW    |
| B | 0.68V | 3.41V | 8.27V | 9.68V | 9.6V  | 0.70V | —     | 0.71V | —     | 0.67V | 8.87V | 8.98V | 8.90V |
| C | 3.41V | 4.79V | 8.89V | —     | —     | 0.08V | 1.51V | 0.08V | 8.89V | 0.01V | 0.69V | 9.68V | 9.59V |
| E | —     | 2.75V | 8.98V | 9.75V | 9.67V | —     | —     | —     | —     | —     | 8.93V | 9.69V | 9.61V |

|   | Q7    | Q8    |       |       | Q9    |       |       | Q10   |       |       | Q11   |       |       |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|   |       | FM    | MW    | LW    | FM    | MW    | LW    | FM    | MW    | LW    | FM    | MW    | LW    |
| B | 0.65V | 0.05V | 0.08V | 0.10V | 0.64V | 0.65V | 0.62V | 1.11V | 1.13V | 1.08V | 0.62V | 0.64V | 0.59V |
| C | —     | —     | —     | —     | 4.60V | 1.48V | 7.05V | 4.60V | 1.48V | 7.05V | 7.03V | 0.81V | 9.74V |
| E | —     | —     | —     | —     | —     | —     | —     | 0.64V | 0.65V | 0.62V | —     | —     | —     |

|   | Q12   |       |       | Q13   |       | Q14   |       | Q15   |       | Q101 Q201 |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|
|   | FM    | MW    | LW    | FM    | MW/LW | FM    | MW/LW | FM    | MW/LW |           |
| B | 1.08V | 1.12V | 1.02V | 0.01V | 0.68V | 0.25V | 5.0V  | 6.45V | 0.31V | 1.68V     |
| C | 7.03V | 0.81V | 9.74V | 6.51V | 0.01V | 0.26V | 0.32V | 0.26V | 0.32V | 5.35V     |
| E | 0.62V | 0.64V | 0.59V | —     | —     | 0.26V | 0.32V | 0.26V | 0.32V | 1.05V     |

|   | Q301  | Q302  | Q303       | Q304   | Q305   | Q306      |           |
|---|-------|-------|------------|--------|--------|-----------|-----------|
|   |       | Rec.  | Beetcut ON |        |        | Vol. Min. | Vol. Max. |
| B | 0.98V | 0.26V | 0.80V      | 11.74V | 12.45V | —         | 0.76V     |
| C | 4.32V | 6.50V | —          | 17.67V | 17.38V | 16.1V     | 0.98V     |
| E | 0.34V | 0.08V | —          | 11.37V | 11.75V | —         | —         |